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Sound Maps of Singing Insects at Seven Hudson Valley Orchards



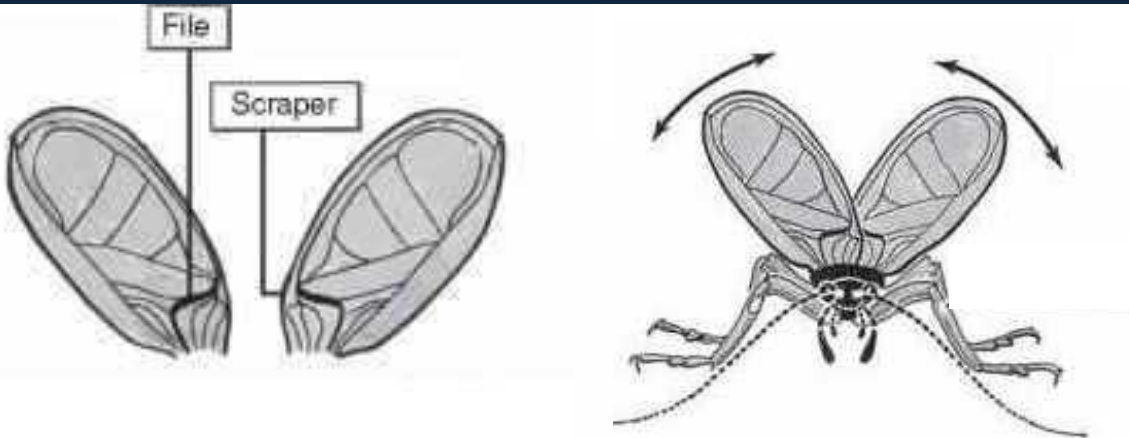
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Who's Singing?

- After the frogs and the birds
- Crickets, Katydid, Grasshoppers, Cicadas
- Mostly male's species specific "calling songs"
- Also territorial
- Phonotaxis
- Courting call
- Tremulation

Their Songs

- Most Orthopterans use stridulation to make their songs
- Scraper (hardened margin) and file (enlarged structural vein)
- Think Guiro
- Temperature higher = faster songs



<http://attractingamatewithsound.weebly.com/stridulation---the-crickets.html>



<http://tlooh.com/guiro/>

Other Types of Song Production

- Grasshopper - Stridulation with hind legs
- Pegs function like file
- Band-winged Grasshoppers crepitate
- Cicadas have Tymbals

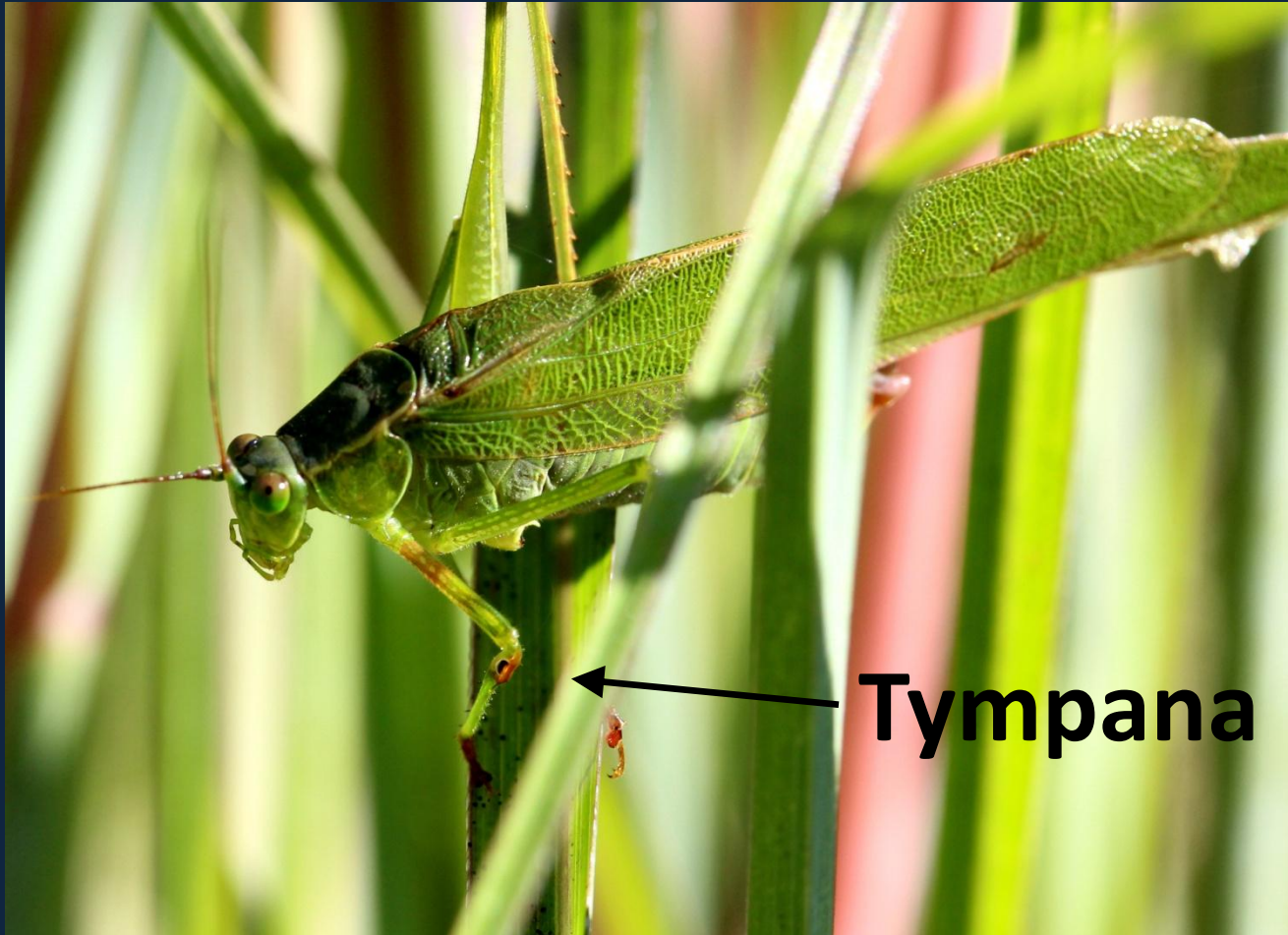


<http://biology.nicerweb.com/Locked/media/ch01/grasshopper-pegs.jpg>



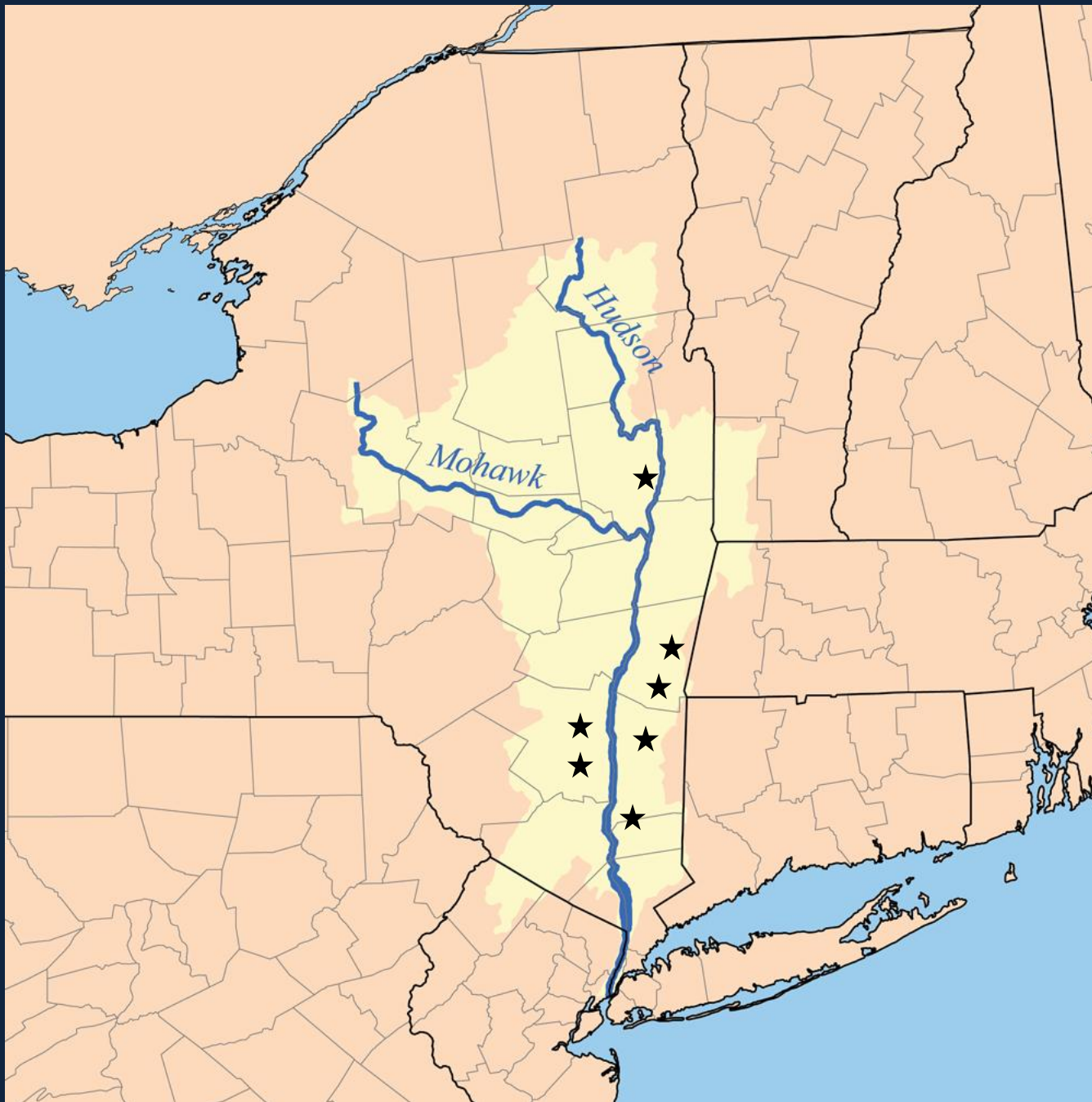
Photo Courtesy Lang Elliot and Wil Hershberger

Orthopteran Hearing



Types of Songs

- Songs range from 2,000-15,000 Hz (humans can hear up to 20,000 Hz)
- Crickets trill and chirp under 10,000 Hz
- Grasshoppers and Katydid have wide band songs, often above 10,000 Hz
- A mosaic of noise – buzzes, ticking, rattling
- Cicadas usually below 10,000 Hz
- A very raspy trill



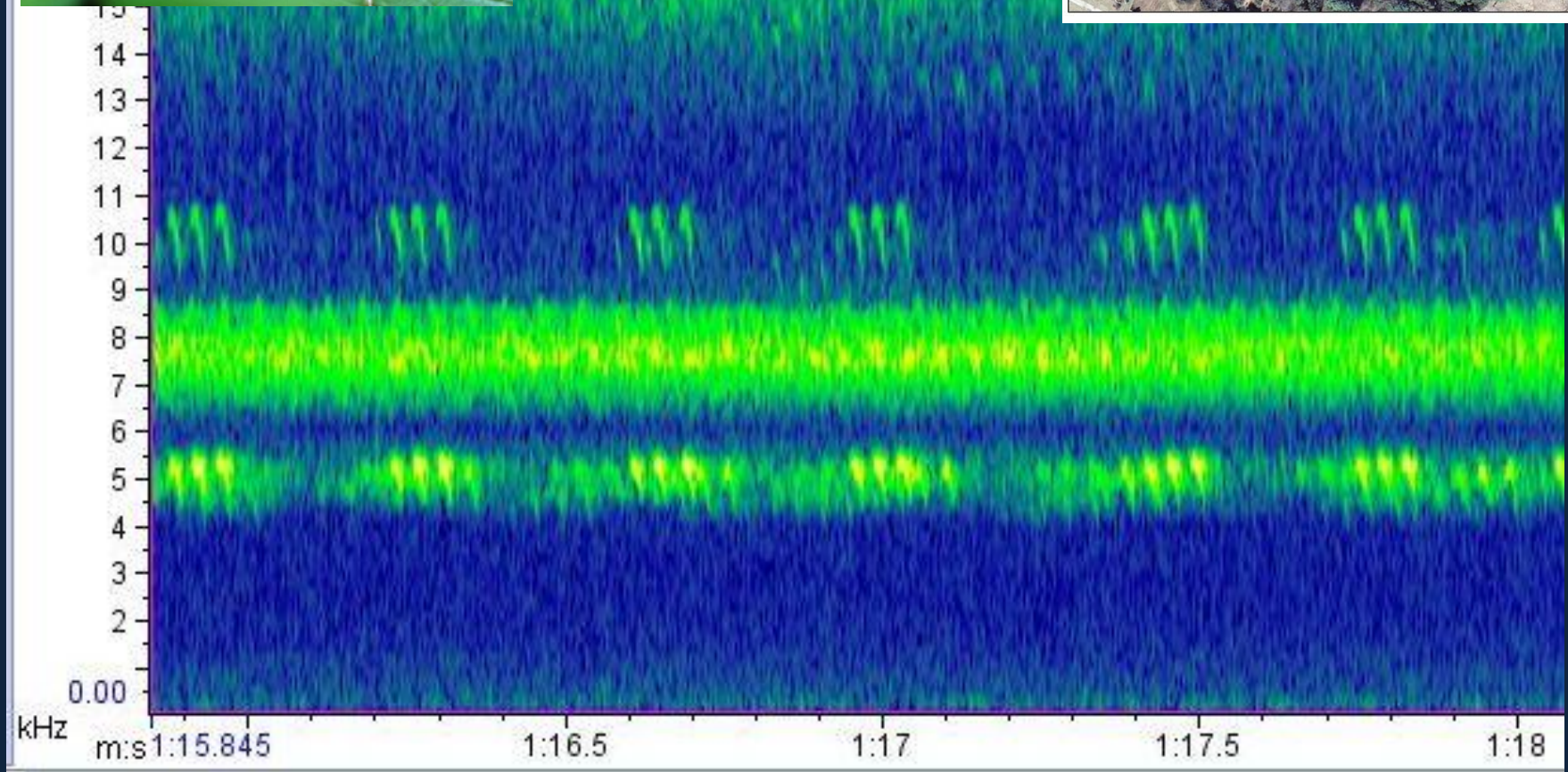
How We Made Soundmaps

- Sound Survey
- GPS-tagged recordings at about 115 points per orchard

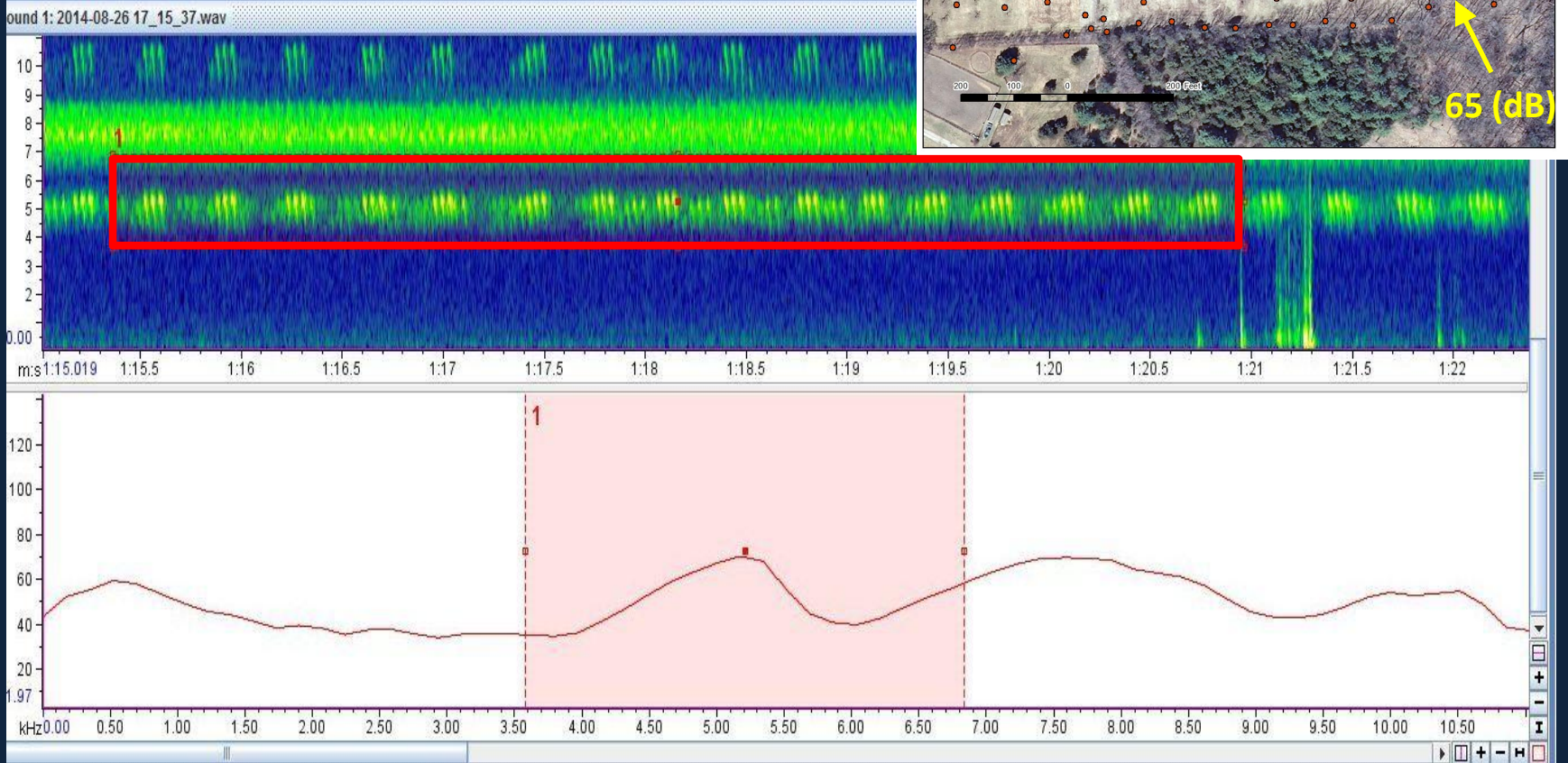
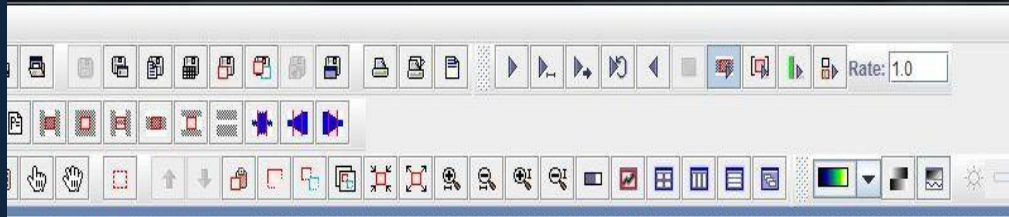


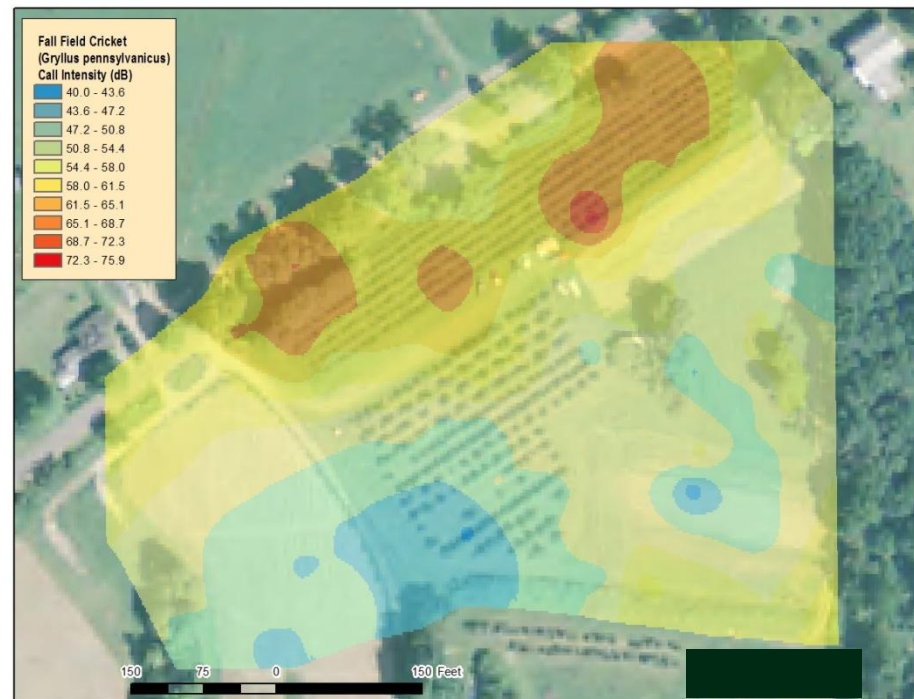
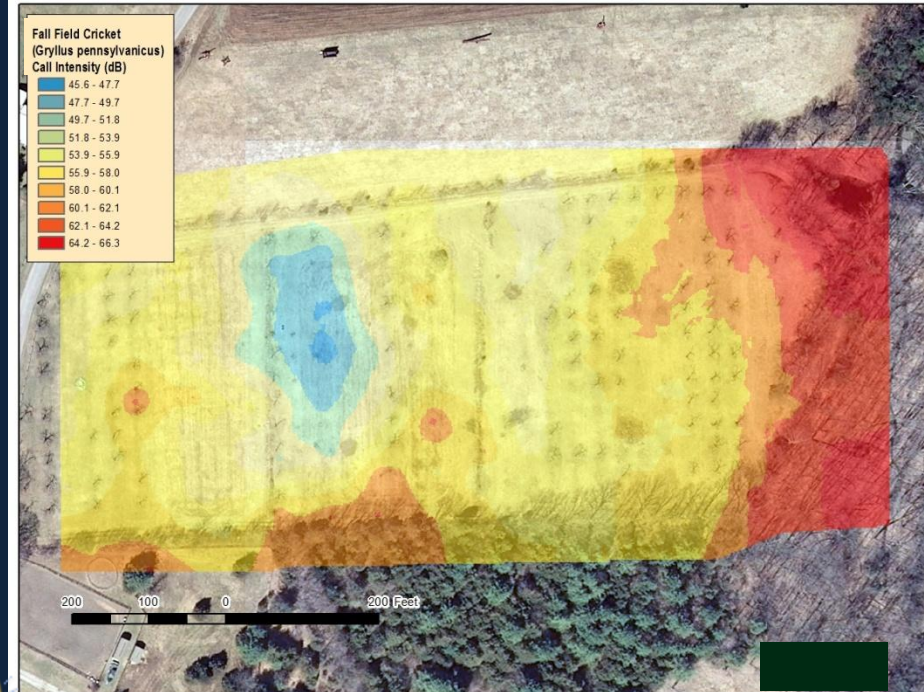
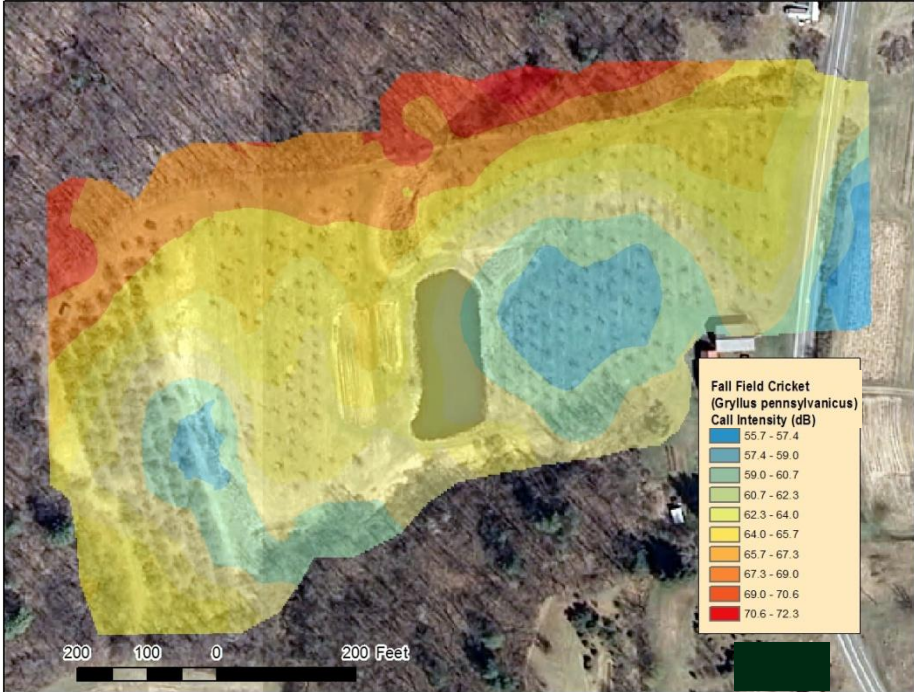
Analysis





Cricket photo Courtesy Lang Elliot and Wil Hershberger





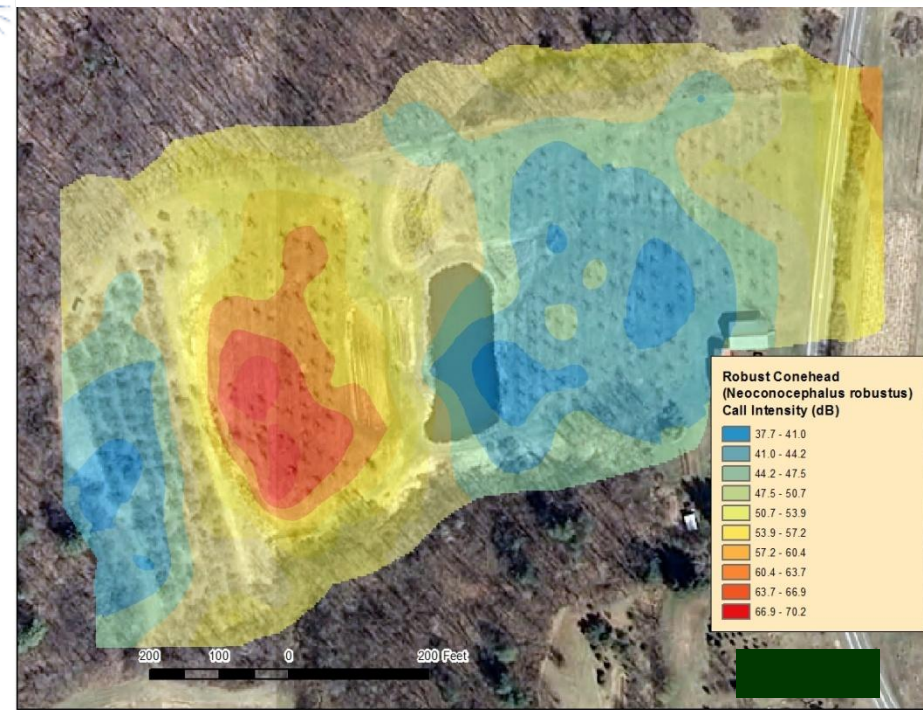
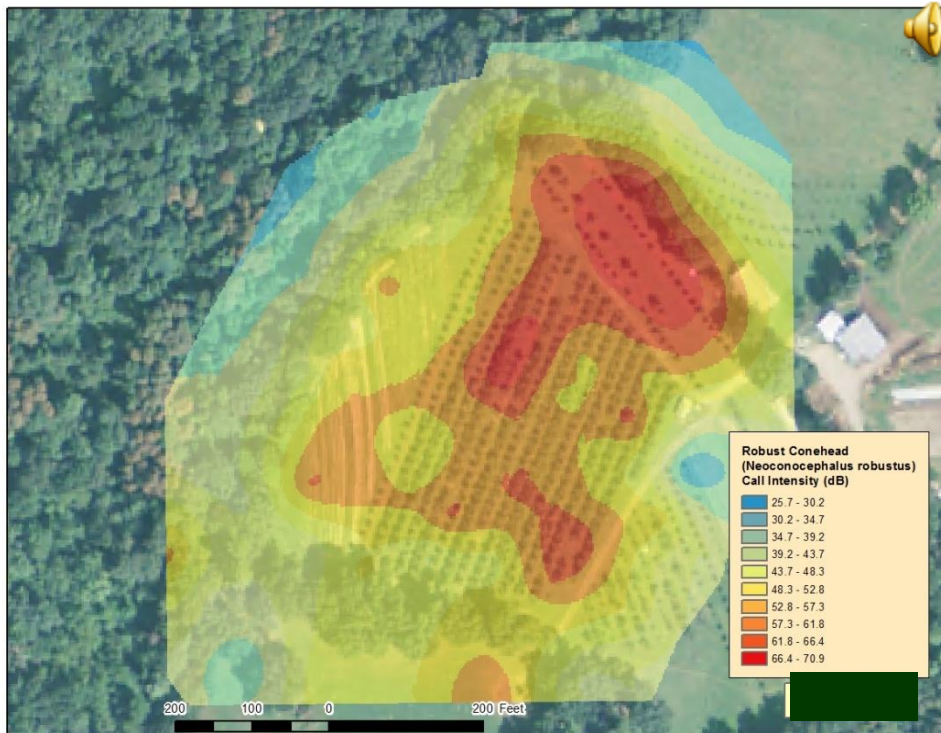
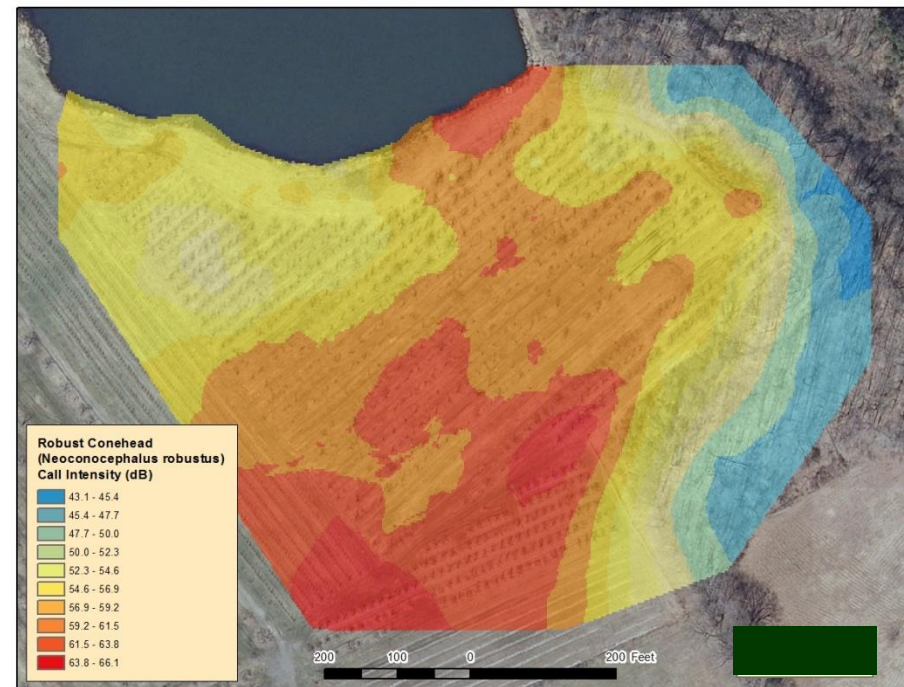
Despite being a “field cricket”, the Fall Field Cricket seemed to favor edges.

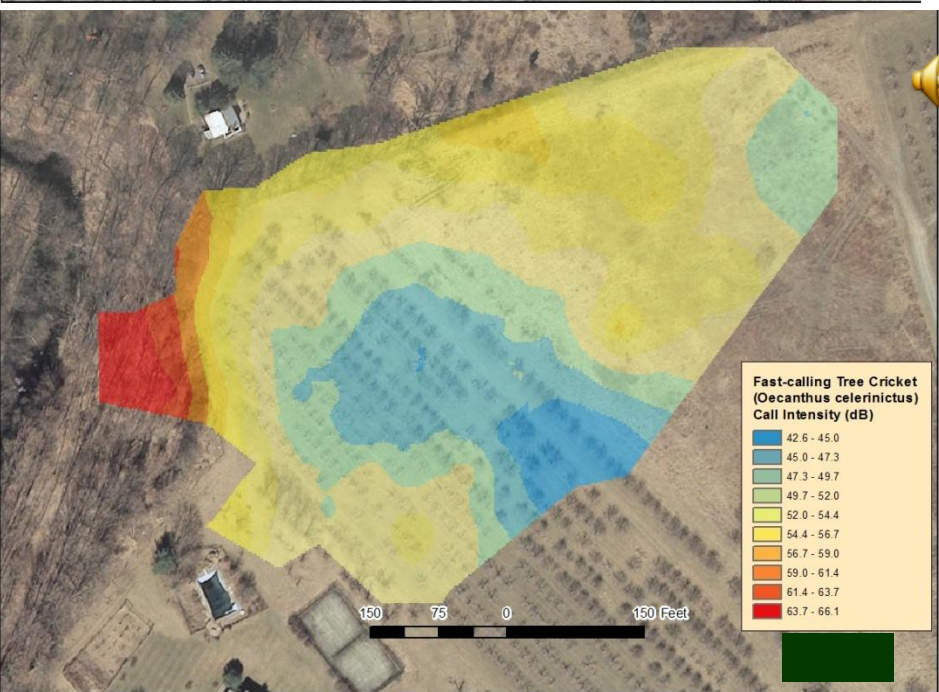
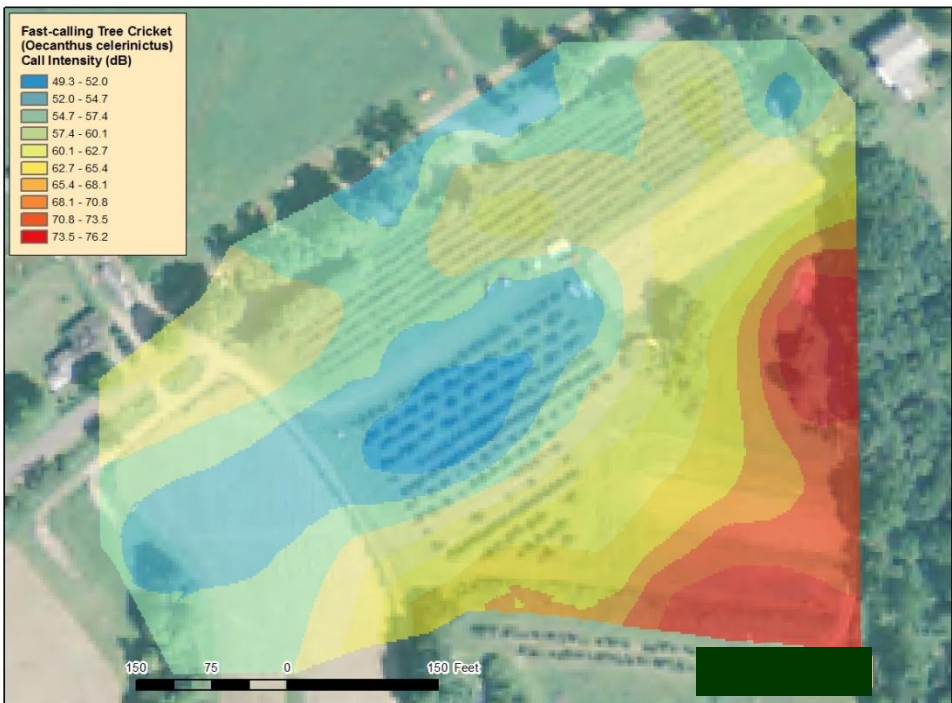
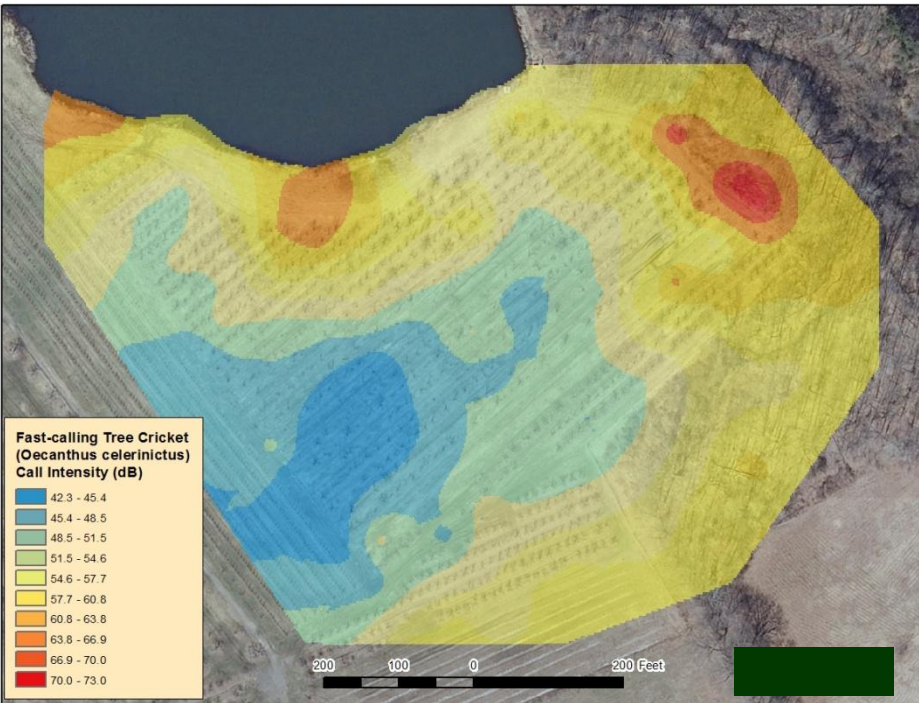


Photo courtesy Lang Elliot and Wil Hershberger



The Robust Conehead favored relatively longer grass in the orchards





The Fast-calling Tree Cricket seems to be mainly a forest species



Photo courtesy Lang Elliot and Wil Hershberger

The Four-spotted Tree Cricket is a species of
course grasses, rather than a true cricket of
the trees

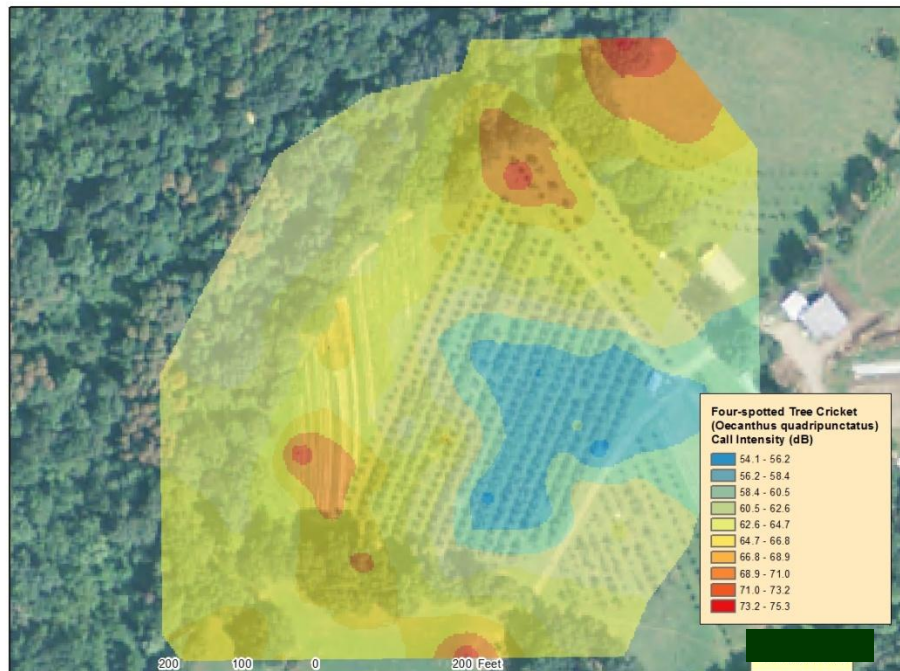
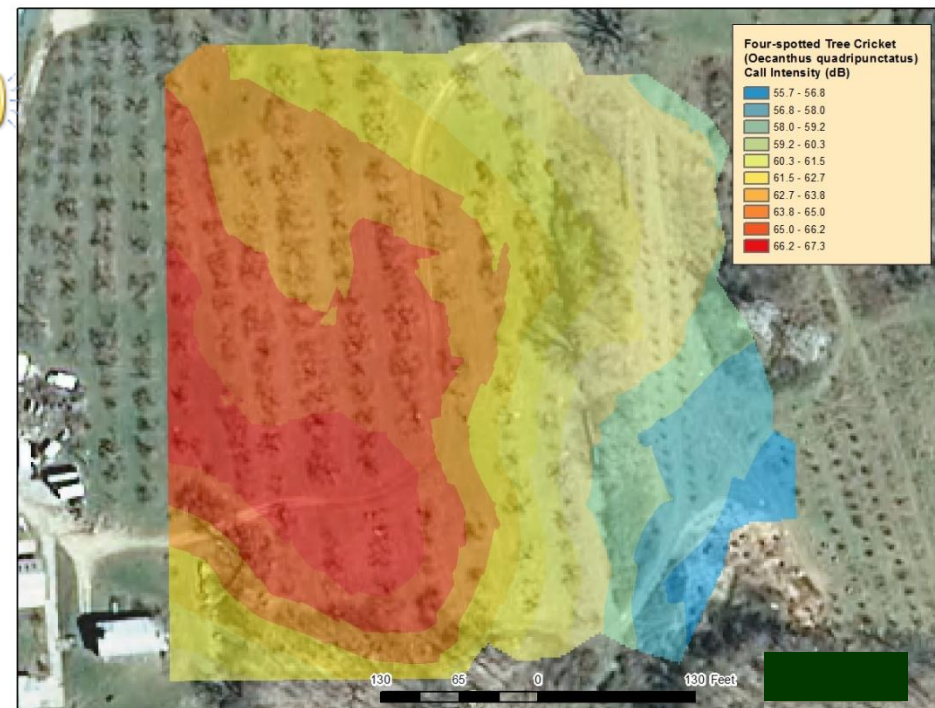
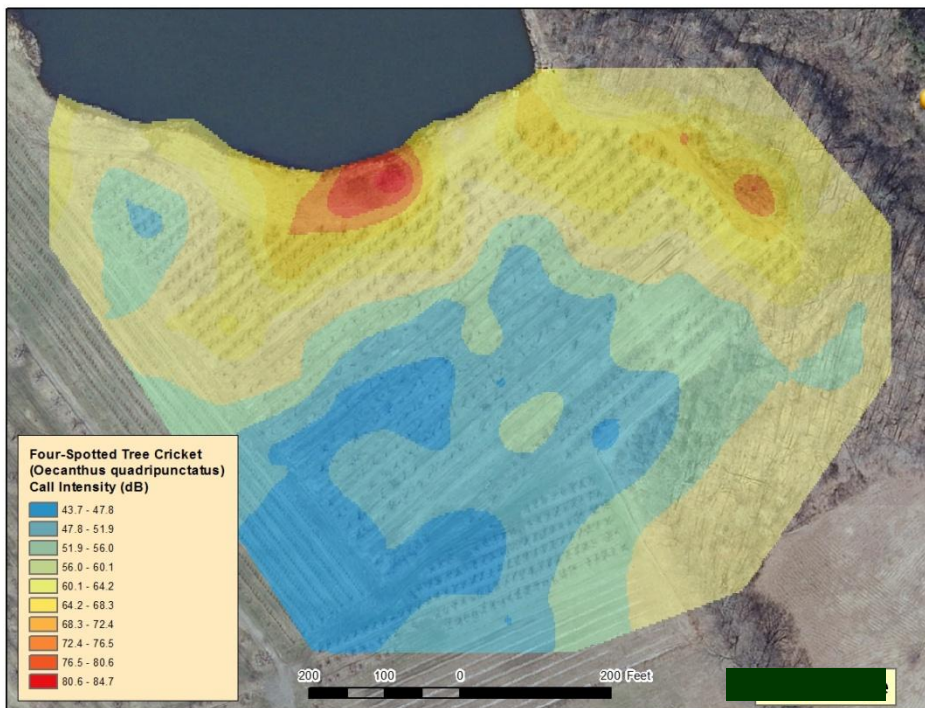
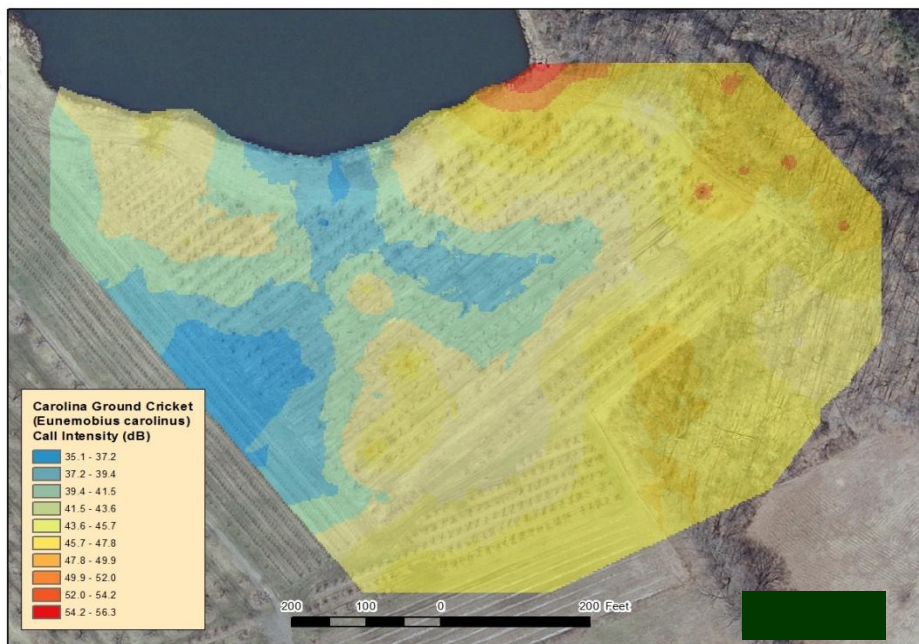
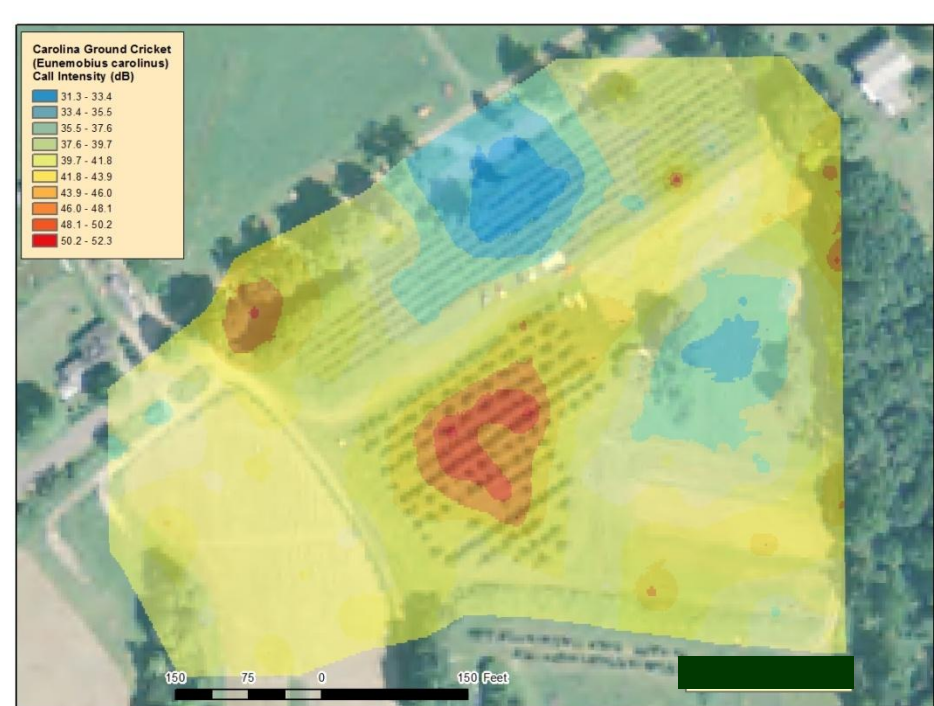
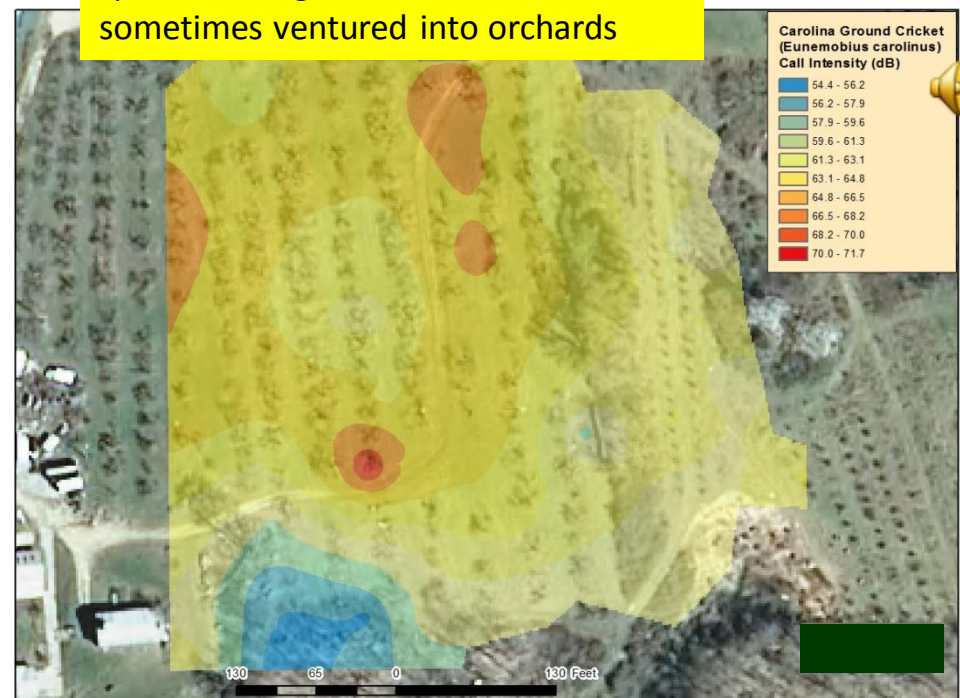


Photo courtesy Lang Elliot and Wil Hershberger





The Carolina Ground Cricket is a species of edges and fields that sometimes ventured into orchards



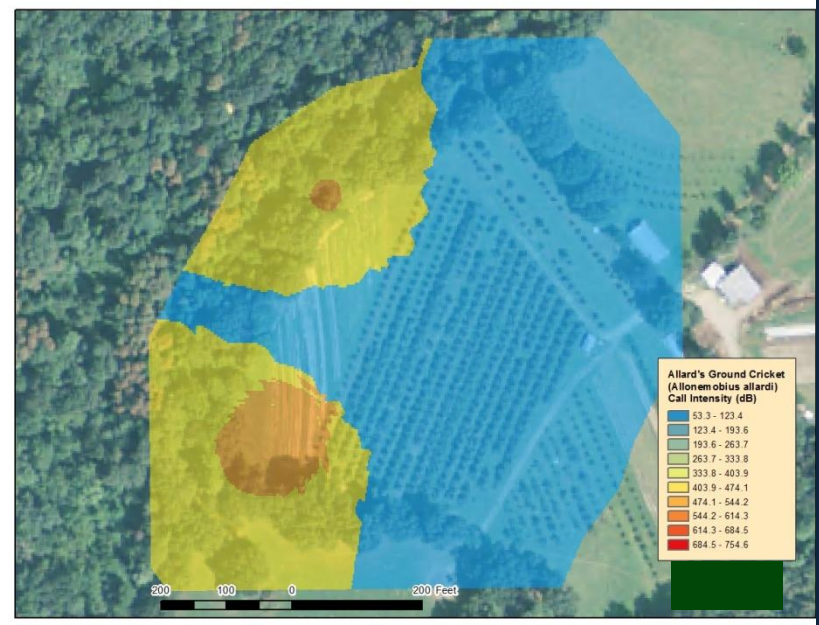
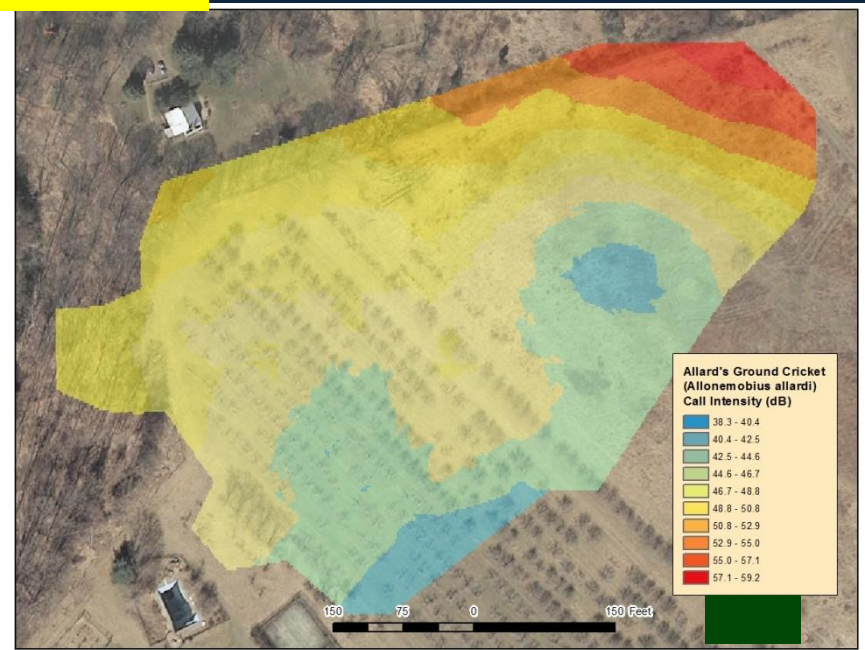
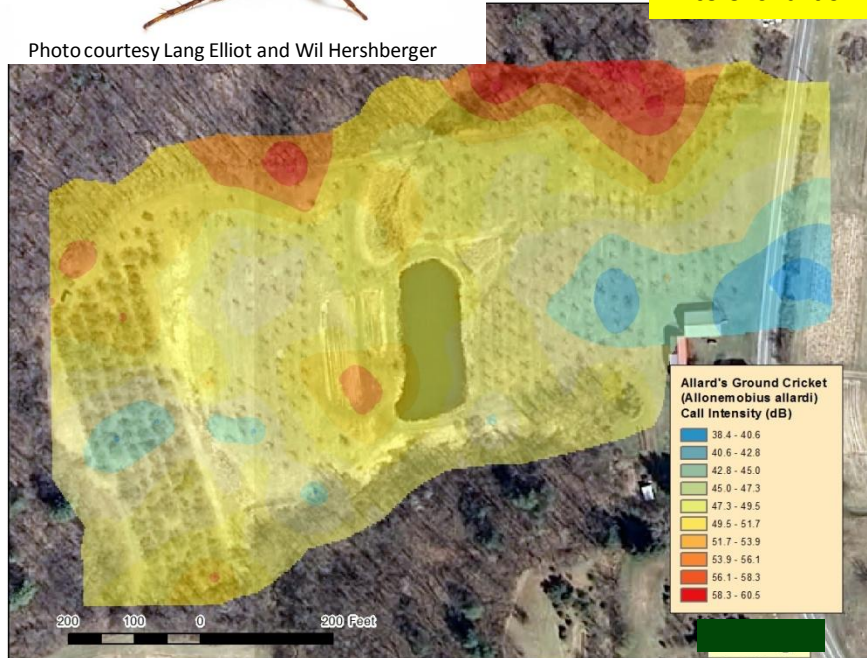
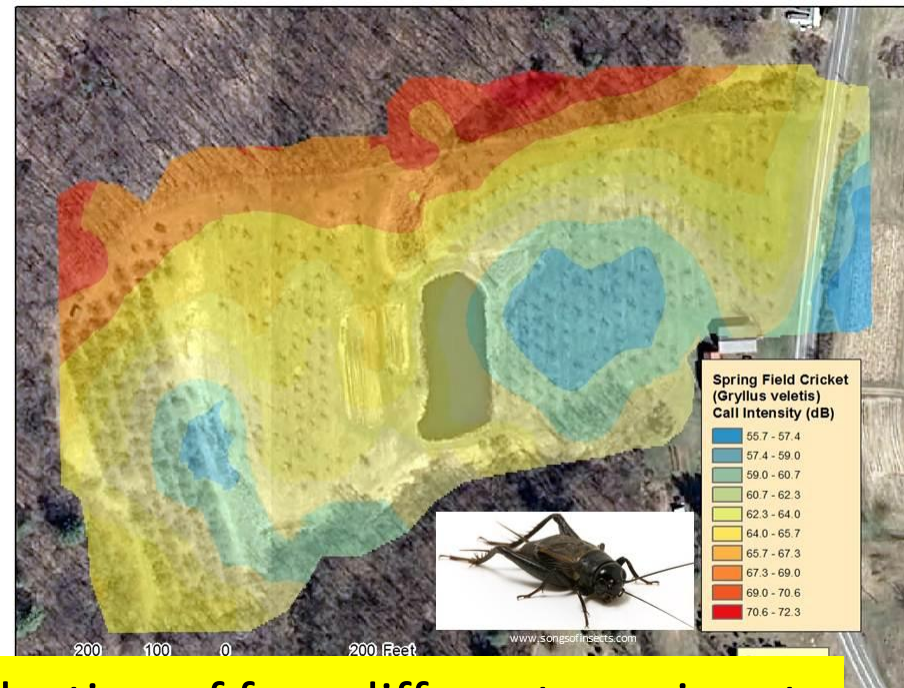
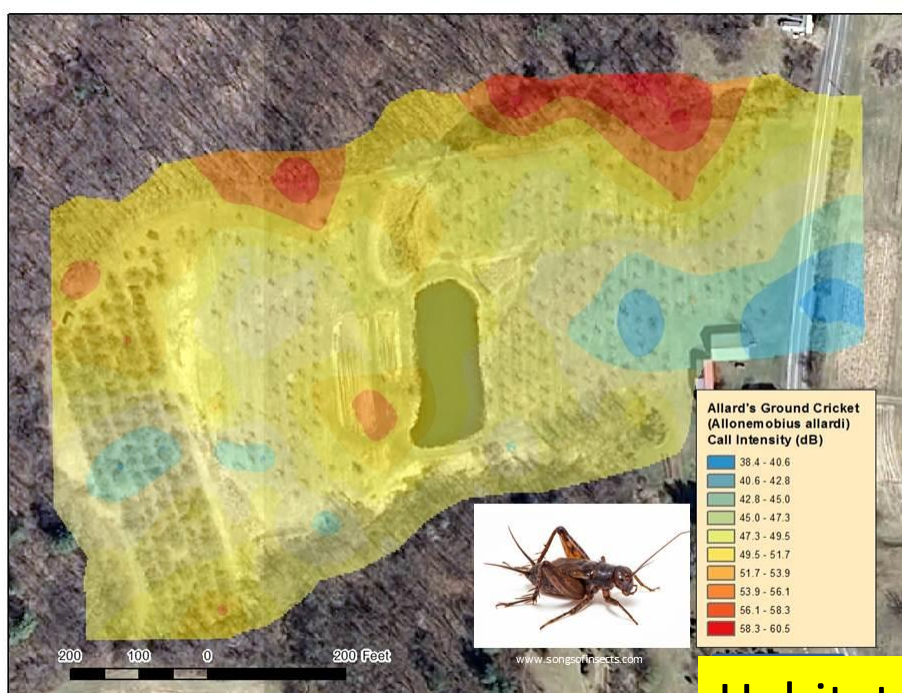


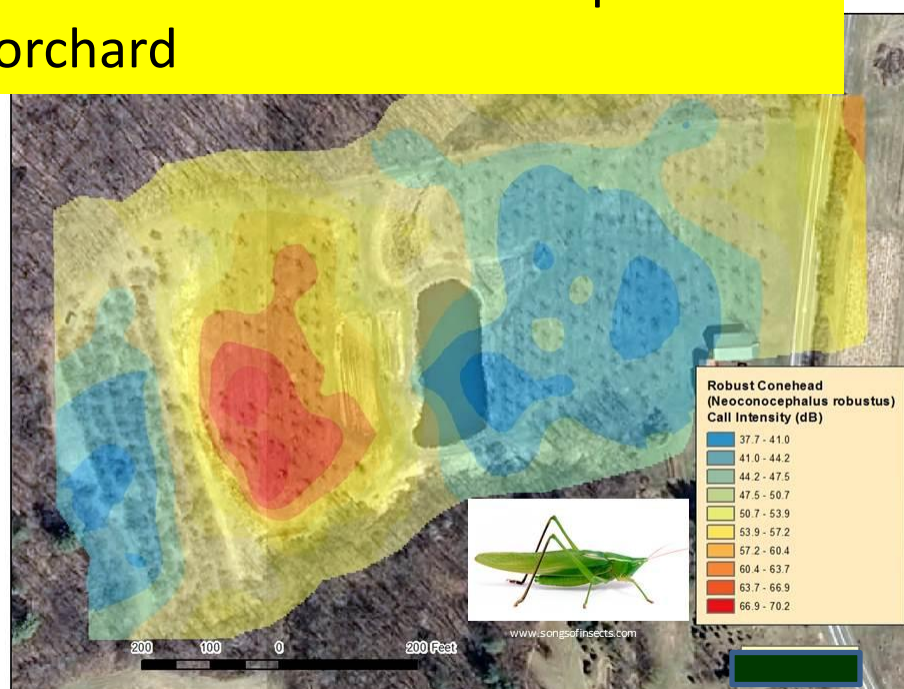
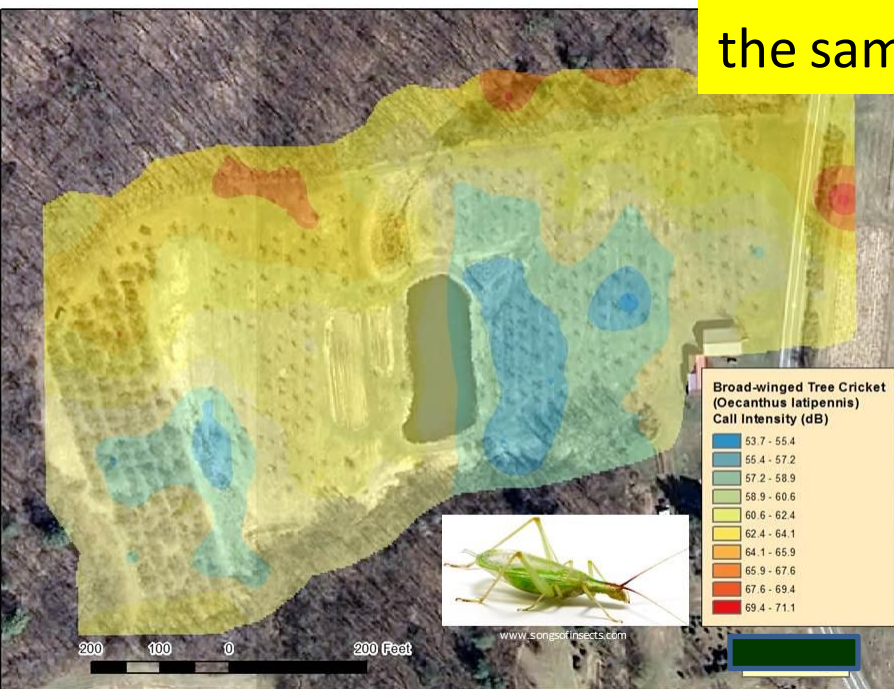
Photo courtesy Lang Elliot and Wil Hershberger

Allard's Ground Cricket frequents forest edges, occasionally expanding into orchards





Habitat selection of four different species at the same orchard



What Did We Learn and Other Potential Uses for Sound Maps

- Can provide an intuitive visual perspective
- display aspects of ecology difficult to convey
- A potential tool for understanding and displaying the spatial distribution of species that make noise

Acknowledgement

- Big thanks to Lang Elliot and Wil Hershberger
www.songsofinsects.com
- To the orchardists
- Thanks to the singing insects!

